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Food & Nutrition Research News Briefs



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Nutrition and Health

Blood pressure can be lowered by consuming more linoleic acid--the main polyunsaturated fatty acid in safflower, corn, and soybean oils--according to new findings. Previous research found that elevated blood pressure could be lowered by reducing total fat calories and increasing the proportion of polyunsaturated to saturated fats. But subsequent studies indicated that the proportion of polyunsaturated to saturated fat was unimportant. It now appears that the total amount of linoleic acid in the diet, and not its proportion to saturated fat, is the determining factor. People would get the most benefit, however, from reducing total fat while increasing vegetable oils in their diets. Lipid Nutrition Lab, Beltsville Human Nutrition Research Center, Beltsville, MD
Joseph Judd, (301) 344-2014

Bottle-fed babies might have fewer digestive problems if a natural protein in breast milk is added to infant formula. Lactoferrin was known to help infants absorb iron from mother's milk and protect them against intestinal infection. It now appears that the protein also speeds growth and development of the intestinal tract. Concentrated in human colostrum (the breast secretion preceding milk), the protein stimulates rapid division of cells that generate the intestinal lining. Cow milk- and soy-based formulas inhibit this cell division; adding lactoferrin restores it. Bottle-fed babies have more colic, diarrhea, and food intolerances than breast-fed babies, which may be caused by an immature digestive capacity. Studies of several newborn animals show that their digestive systems mature much

faster--within a few days after birth--if they are suckled. A method for synthesizing lactoferrin by recombinant DNA is being developed elsewhere. Children's Nutrition Research Center, Houston, TX
Buford L. Nichols, (713) 799-6006

Fried chicken from the Nation's largest chicken fast-food chains has considerably more fat and starch than USDA-estimated values for comparable deep-fat fried cuts, a nationwide sampling showed. This is due to the extra breading, which absorbs cooking fat. The fat content of light and dark cuts from Kentucky Fried, Church's, Popeyes, and Pioneer averaged nearly 18% of total calories with little difference between brands. That's about twice as much fat as USDA values for fried breasts (9%) and nearly one-fourth more than USDA values for fried drumsticks (14%). USDA values, published in Handbook 8, are calculated from poultry composition data rather than from direct analysis as was done in this study. The extra breading also pushed starch content well above the 2% quoted in Handbook 8. In cuts from the four chains plus Jim Dandy and Bojangles, starch accounted for 6% to 13% of total calories, depending on the brand, the recipe and the cut. Nutrient Composition Lab, Beltsville Human Nutrition Research Center, Beltsville, MD
Joanne Holden, (301) 344-2186

How much calcium people get in their diet is important, especially since low intake may be associated with osteoporosis in elderly women. A study reported in the ARS Family Economics Review compared costs of different foods that provide equal amounts of calcium. It showed that among dairy products, milk generally provides the most calcium at the least

cost. Other economical sources are tofu (soybean curd) processed with calcium sulfate and enriched or fortified breads. Calcium can also be obtained from dark green leafy vegetables, fish with edible bones, and some enriched or fortified cereals. About two-thirds of the U.S. population does consume their Recommended Dietary Allowance (RDA) for calcium. Family Economics Research Group, Hyattsville, MD
Dianne D. Odland, (301) 436-5194

When Bugs Bunny says, "What's up, doc?" he isn't asking about his cholesterol level; the fiber in his diet keeps it low. Now scientists have pinpointed the chemical in carrots and other "rabbit foods" that lowers cholesterol. Calcium pectate--a salt of pectin found in plant cell walls--binds to and eliminates bile acids, which the body normally reuses to digest fats. This forces the body to dip into its supply of cholesterol to make more bile acids. Calcium pectate also binds to free-floating fatty acids, reducing their concentration and thus may play a role in preventing colon cancer. Canadian studies suggest that free saturated fatty acids may be involved in promoting formation of tumors. Macromolecular and Cell Structure Research, Eastern Regional Research Center, Philadelphia, PA
Peter Hoagland, (215) 233-6426

Vitamin C levels in leafy green vegetables such as kale are reduced by high rates of nitrogen fertilizer. Kale is naturally high in both vitamin C and iron, and vitamin C enhances the absorption of iron in the body. Many diets in the world are deficient in iron. The ultimate goal is to feed kale grown with various rates of nitrogen fertilizer to people or lab animals to see if it will affect bioavailability of iron. Soil Microbial Systems Lab, Beltsville, MD
Sharon B. Hornick, (301) 344-3327

Human skin cells may help people maintain adequate levels of the active form of thyroid hormone, which keeps the body's metabolism humming. When the thyroid gland secretes too little hormone, the body's primary system for converting the hormone to its active form fails, and a secondary system kicks in. If scientists could find a way to stimulate the secondary system, it might provide a more natural way to treat hypothyroidism. But until now, they didn't know where it was located. ARS collaborated with a scientist at Tufts University and a visiting scientist from China to pinpoint one source of the necessary enzymes. These occur in the keratinocytes--the cells in the outer layer of skin. Human Nutrition Research Center on Aging at Tufts, Boston, MA
Philip R. Gordon, (617) 556-3144

Foods high in fiber may not interfere with the way the body absorbs and uses the B vitamin folate (AKA folic acid or folacin) as suggested by earlier studies. ARS and University of California at Berkeley researchers studied six volunteers who spent more than 5 weeks on a liquid diet, supplemented with portions of navy beans and wheat bran. Neither the beans nor bran altered the availability of the common (polyglutamate) form of folate; bran actually enhanced absorption of the less common (monoglutamate) form. The best sources of folate, which is needed for growth and reproduction and for preventing anemia, include whole wheat products, nuts, liver, yeast, leafy vegetables, and legumes such as beans. Food Quality Research, Western Regional Research Center, Albany, CA
Pamela M. Keagy, (415) 486-3193

Tomorrow's Foods

Two new small watermelons--sweeter, firmer, and crisper than other small "icebox" types and most big ones--could be big sellers here and abroad. ARS test-shipped to Europe Mickylee and Minilee, two 5- to 12-pound melons developed in 1984 by the University of Florida. The melons need no refrigeration, and all 10 importers who saw them liked them better than other icebox types. Small European shops and street vendors don't want 25-pound monster melons, and per capita consumption in the United States has dropped, partly because families are smaller today. Mickylee and Minilee can be grown wherever regular watermelons can grow.

Export and Quality Improvement Research,
Orlando, FL

Lawrence A. Risse, (305) 897-7326

"Fat as a pig" may become an obsolete expression if ARS scientists have their way. In recent tests, pigs given daily injections of pig growth hormone grew 10% to 20% faster on 30% less feed. Chops from these pigs had 7.35% more meat and 28.62% less fat on the rim of the chop, although the fat ratio in the meat itself was unchanged. Before hormone therapy can be used on farms, it must be approved by the Food and Drug Administration. Also, daily injections would be impractical; other delivery systems such as implants have to be developed. The tests are part of the ARS program to produce leaner meat while retaining the nutritional quality of meat products. Nonruminant Animal Nutrition Lab, Beltsville, MD
Norman C. Steele, (301) 344-2222

Small farmers are increasing their incomes with new pepper and strawberry varieties. One farmer in upstate New York is growing about 2 acres of the everbearing Tristar strawberry, which continues to produce fruit into mid-October. He hopes to make up to \$20,000 an acre in profit this year, and says he can make about eight times more per acre with Tristar than he can with traditional varieties. Another small farmer in South

Carolina is growing 15 acres of a hot pepper, Carolina Cayenne, which has resistance to the southern root knot nematode. The new variety has saved him between \$750 and \$1,500 in nematode control costs, and he has bought equipment to dry the peppers and sell them to a company that uses them in sausage seasoning and in a batter mixture for Louisiana Cajun-style chicken.

Fruit Lab, Beltsville, MD

Gene Galletta, (301) 344-4652

U.S. Vegetable Lab, Charleston, SC

Richard L. Fery, (803) 556-0840

Beneficial soil organisms that live with soybeans can change the nutrients in the living plant--and thus in the soy foods we eat--in a way that chemical fertilizers can't. An ARS study has shown for the first time that beans from soybean plants grown along with certain soil organisms had higher amounts of nutrients like zinc and copper than beans picked from plants grown with chemical fertilizers. The helpful organisms--bacteria that furnish nitrogen and mycorrhizal fungi that provide other needed minerals--increased both the quantity of soybean oil in the seeds and the ratio of polyunsaturated to saturated oils. This finding might give scientists an innovative, effective way to improve soy products to increase export markets for this surplus crop.

Plant Development Quality Research,
Albany, CA

Raymond S. Pacovsky, (415) 486-3529

Rhizobacteria on the roots of peanut plants help supply not only nitrogen, but also many other essential minerals. This finding could lead to healthier plants and more nutritious peanuts. Scientists field-tested Florunner peanuts inoculated with eight rhizobia strains. Compared to plants that were not inoculated, those inoculated with a commercial strain of Bradyrhizobium had greatly increased levels of many nutrients in root nodules, including iron, phosphorus, boron, calcium, magnesium, zinc, copper, potassium, and manganese. Nutrient gains also appeared in the peanuts themselves. Scientists hope to discover just how rhizobia send these nutrients into

plants. Similar tests are planned with soybeans.

Plant Stress Lab, Beltsville, MD
Robert K. Howell, (301) 344-4527

Food Freshness & Safety

Potato plants with a built-in insect repellent have come from cell-fusion experiments. ARS scientists discovered a few wild potato plants from South America with high levels of leptine, an insect-repelling toxin. In a petri dish they fused cells from the wild plants with cells from a commercial potato. Then they grew the fused cells into whole plants that had leptine in their leaves. The hybrid plants have built-in resistance to the Colorado potato beetle--a voracious pest that each year costs over \$120 million to control.

Vegetable Lab, Beltsville, MD
Stephen L. Sinden/Kenneth L. Deahl,
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Better detection of the bacterium that causes the food-poisoning disease listeriosis is now possible. Scientists have developed a method for distinguishing between healthy and injured cells of Listeria monocytogenes, which can grow in meats and dairy products. The bacterium is killed by heating during cooking or pasteurization, but improper heating only injures the organism, which can then repair itself and multiply. Current tests sometimes fail to pinpoint these injured cells; the new test detects them and lets industry and regulatory agencies know the true level of contamination. In 1985, L. monocytogenes killed 47 people who ate tainted cheese in California. USDA's Food Safety and Inspection Service officially began monitoring the organism in cooked, ready-to-eat meat and poultry on September 1.

Microbial Food Safety, Eastern Regional Research Center, Philadelphia, PA
James L. Smith/Robert L. Buchanan,
(215) 233-6620

Russet Burbank potatoes--used by most restaurants for making french fries and baked potatoes--may soon be replaced by

less heat-sensitive varieties. The record-breaking summer temperatures of 1985 in western Idaho and eastern Oregon caused Russet Burbank potatoes to build up excessive amounts of sugar in their stem ends. French fries made from these potatoes can have dark, unappetizing areas that make them unacceptable for freezing or for use by fast food restaurants. As a result, in the 1986 growing season farmers lost 40% of their contracts; 12,000 fewer acres were planted to potatoes. ARS scientists have found a smoother skinned, heat-resistant line equal in all other respects to Russet Burbank. With successful breeding, new heat-resistant potatoes could be available to growers in 3 years.

Cereal and Vegetable Crop Production,
Aberdeen, ID

Joseph J. Pavsek, (208) 397-4181

Florida orange juice producers and agency scientists are cooperating to improve the flavor of orange juice packaged in new sterile containers. These small plastic containers come with straws and have become popular for consumers. Heat-pasteurized juice is added after the containers are sterilized with a mild solution of hydrogen peroxide or other chemicals. But some companies stopped packaging orange juice this way because the juice starts losing its flavor after only two weeks of storage at room temperature. ARS scientists have detected changes in the oils and other juice chemicals that cause the flavor loss. This information will help the juice industry improve the quality of the products.

U.S. Citrus and Subtropical Products Lab,
Winter Haven, FL

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The **Briefs** is published quarterly in January, April, July, and October. For further information or addition to the mailing list, contact Judy McBride, ARS Nutrition Editor, at (301) 344-4095; or write to me at ARS Information, Bldg. 005, BARC-West, Beltsville, MD 20705.